

A SYNOPSIS OF THE GENUS *NOTAULACELLA* ENDERLEIN IN  
CENTRAL AMERICA: THE DIVERSITY OF A CANOPY FAUNA  
(DIPTERA, CHLOROPIDAE)

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*Abstract.*—Fogging of the high forest canopy in Panama yielded 15 species of a genus previously known from few specimens from scattered Neotropical localities. The addition of other Central American specimens, including the previously described *N. compta* (Duda) and *N. schildi* Duda, made a total of 18 species, of which 16 are new (one left unnamed). New species of *Notaulacella* are *vittata*, *spinosa*, *buscki*, *cabimae*, *albitarsis*, *polita*, *pau-cipilosa*, *octicola*, *zeteki*, *lineigena*, *sagittata*, *broadheadae*, *ligatura*, *tripunctata*, *laterivittata*.

*Key Words:* Taxonomy, Diptera, Chloropidae, *Notaulacella*, new species, canopy fogging

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The chloropid genus *Notaulacella* Enderlein (subfamily Oscinellinae) has been little noticed, and few specimens from the Neotropical Region are known in collections. Six species have been described, three from southern Brazil, one from Paraguay, and two from Costa Rica, from a total of less than 20 specimens. It was therefore of unusual interest to find 15 distinct species of the genus, 14 new, in a large collection of Chloropidae made by fogging the high forest canopy of trees in Panama, in a study conducted by Mrs. Eley C. Broadhead, University of Leeds, England. These and a few other specimens are described and keyed here as a contribution to the study of species diversity in tropical forests and in particular in the forest canopy, a 'frontier' that is of special interest at the present time.

Enderlein described the genus in 1911 from a new species, *N. armillata*, from southern Brazil. Oddly enough, in another genus in the same paper he described two species that really belonged in his new ge-

nus, *Oscinosoma angustata* and *O. trapezispotron*, also from southern Brazil. Becker (1912), in his large monograph of the Neotropical Chloropidae, referred the species to *Oscinella* Becker and redescribed them from the types, apparently without additional material. Duda (1930), in monographing the Neotropical Chloropidae, proposed a new genus *Baseoneura* for two new species (Costa Rica, Paraguay) plus Enderlein's two species of *Oscinosoma*, and *Notaulacella armillata* Enderlein, the type species of *Notaulacella*! Duda (1931: 165) corrected his error and synonymized *Baseoneura* under *Notaulacella*. Finally, Duda (1933) described *N. trapezispotron* var. *schildi* from Costa Rica, a form now recognized as a distinct species.

Eighteen species are here recognized from Central America, of which 16 are new (one left unnamed) and two previously described. Other than the canopy material, the difficulty of past study is evidenced by the extreme scarcity of available material. In

addition to specimens from Central America, the National Museum of Natural History in Washington contains 13 specimens of 12 or 13 species, mostly undescribed, from 7 countries (one specimen from Jamaica, the others from South America, ranging from Colombia to Argentina). No doubt canopy collecting from other areas would yield additional new species from the Neotropical Region.

The type material of the six described species was studied in previous years. The Central American species are distinct from the four described from southern Brazil and Paraguay. Type material of the new species is in the National Museum of Natural History, Washington, D.C. [USNM].

The canopy fogging was carried out at two localities in Panama (Canal Zone), one near Colón, a humid forest on the east shore of Gatun Lake, 2–14 July 1979 (Trees 1–8); the other some miles south of Panama City, a monsoon forest, 15–30 July 1979 (Trees 9–16) (collectors E.C. Broadhead et al.). Identifications of some of the species of trees are available, but the scattering of species of flies does not indicate that the individual tree identities are significant. Tree numbers are used for brevity to simplify the data and to show the scatter of records. The Gatun Lake locality was apparently more favorable for these flies, at least for the genus *Notaulacella*; 3.6 times as many specimens of this genus were collected on Trees 1–8 as on Trees 9–16.

The biology is unknown. The few rearing records cited under the species (see *N. compta* and *N. zeteki*) are so varied as to suggest that the larvae may be scavengers, living in frass produced by phytophagous insects.

*Notaulacella* Enderlein

*Notaulacella* Enderlein 1911: 212. Type, *N. armillata* Enderlein (orig. des.).

*Baseoneura* Duda 1930: 69, 71. Type, *N. armillata* Enderlein (des. Duda 1931: 165).

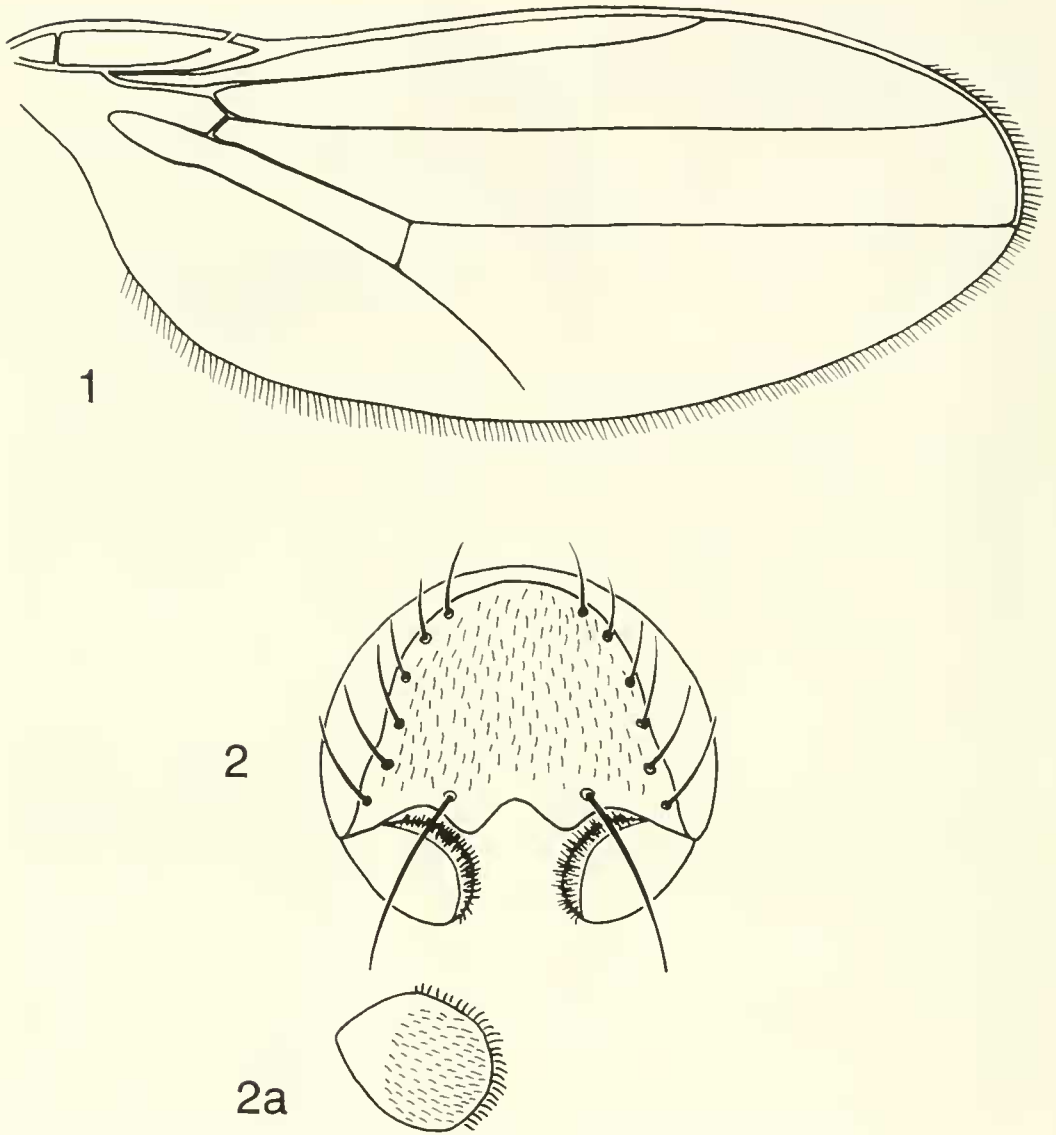
*Notaulacella*: Sabrosky & Paganelli 1984: 24.

Ocellar setae strong and proclinate, divergent, stronger and longer than either postocellars or inner verticals, approaching development of outer verticals; vein R2 + 3 long and cell r1 (marginal cell) narrow, only half as broad as narrowest part of cell r2 + 3; basal section of vein R4 + 5 very short, approximately equal to the short r-m crossvein; discal cell long and narrow, approximately equally broad throughout, crossvein r-m strongly basad, almost opposite basal fourth to third of discal cell; halter knob conspicuously whitish yellow; abdomen nondescript, chiefly infusate, yellowish towards base. Male genitalia small, of the same general pattern in the six species examined, with epandrium inconspicuous; cerci ranging from slight pointed projections to rounded and either narrowly or more widely separated (Fig. 2); surstyli characteristic, all species showing short and broad surstyli with numerous fine hairs, the short hairs covering most of the inner surface and a narrow mesal rim of longer hairs on the outer surface (Figs. 2, 2a). Length, 1.5–2 mm.

The species of this genus are so uniform in size, habitus, and generic features that individual descriptions can be somewhat abbreviated. The genus has a unique combination of attributes, each of which is also unique or of limited occurrence in the family as a whole. The wing venation is especially characteristic (Fig. 1), with the r-m crossvein opposite the basal fourth to third of the discal cell, which suggested the name of its junior synonym, *Baseoneura* Duda.

KEY TO CENTRAL AMERICAN SPECIES OF *NOTAULACELLA*

- 1. Thorax chiefly or entirely yellow to orange-yellow or reddish yellow ..... 2
- Thorax largely black or black-brown, or almost entirely so ..... 8



Figs. 1, 2. 1, wing of *N. paucipilosa*; 2, male epandrium of *N. compta*; 2a, inner surface of left surstylus.

(Thorax yellow)

- 2. Scutum with 4 reddish to brown stripes on yellow background, plus supraalar vittula on each side . . . . . 1. *N. vittata*, n.sp.
- Scutum unicolorous, without stripes . . . . . 3
- 3. Frontal triangle yellow; front femur with row of short, stout black setae antero- and posteroventrally on distal half to  $\frac{2}{3}$  . . . . . 2. *N. spinosa*, n.sp.

- Frontal triangle black or dark reddish, in striking contrast to yellowish thorax; front femur with fine hairlike setae . . . . . 4
- 4. Frontal triangle dull or dully shining, gray microtomentose . . . . . 5
- Frontal triangle smooth and polished . . . . . 6
- 5. Frontal triangle broad and long, acute apex almost at anterior margin of frons; frons yellow outside the triangle . . . . . 3. *N. buscki*, n.sp.

- Frontal triangle narrowly acute to middle of frons; frons broadly black on posterior  $\frac{2}{3}$  . . . . . 4. *N. compta* (Duda)
- 6. Frontal triangle long, apex at anterior margin of frons . . . . . 7
- Frontal triangle short, apex little beyond middle of frons . . . . . 5. *N.* sp. 19
- 7. Front tarsus yellowish . . . . . 6. *N. cabimae*, n.sp.
- Front tarsus with at least distal 4 tarsomeres white . . . . . 7. *N. albitarsis*, n.sp.

(Thorax black)

- 8. Scutum mostly polished black, non-microtomentose except on extreme sides (chiefly notopleura); mesopleuron polished black . . . . . 9
- Scutum dull to subshining, microtomentose; mesopleuron usually partly microtomentose . . . . . 11
- 9. Gena polished black except around base of vibrissa . . . . . 8. *N. schildi* Duda
- Gena dull, gray or silvery microtomentose . . . . . 10
- 10. Scutum densely haired, approximately 10-12 rows between dorsocentral impressions; frontal triangle relatively narrow, well separated from eyes at base, polished black except for narrow band of microtomentum near base and including ocellar tubercle . . . . . 9. *N. polita*, n.sp.
- Scutum less hairy, with more surface showing, an estimated 8 rows of hairs between dorsocentral impressions; frontal triangle large, broad at base, without subbasal band of microtomentum, ocellar tubercle polished black . . . . . 10. *N. paucipilosa*, n.sp.
- 11. Frontal triangle short, apex only slightly anterior to median ocellus; frons (mostly) and scutellum bright yellow . . . . . 11. *N. octicola*, n.sp.
- Frontal triangle longer, apex at middle of frons; frons and/or scutellum otherwise in most species . . . . . 12
- 12. First two antennal segments black; tibiae black except narrowly yellow at base . . . . . 13
- First two antennal segments entirely or chiefly yellowish; tibiae yellow with two narrow black bands, one subbasal, one preapical . . . . . 14
- 13. Gena conspicuously silvery microtomentose, narrow but still wider than usual in genus, nearly  $\frac{1}{2}$  breadth of 3rd antennal segment and 0.14 times height of an eye . . . . . 12. *N. zeteki*, n.sp.
- Gena not conspicuously silvery microtomentose because extremely narrow, almost linear . . . . . 13. *N. lineigena*, n.sp.
- 14. Frontal triangle black, dull or at most subshining, densely gray microtomentose, sides slightly convex, apex almost at anterior margin of frons . . . . . 14. *N. sagittata*, n.sp.
- Frontal triangle black, shining, entirely or partly polished, sides straight, triangle not as long . . . . . 15

- 15. Gena relatively broad for the genus,  $\frac{3}{8}$ - $\frac{1}{2}$  breadth of 3rd antennal segment, and glistening silvery microtomentose; frontal triangle polished black, long, apex barely short of anterior margin of frons . . . . . 15. *N. broadheadae*, n.sp.
- Gena narrower, sublinear, at most  $\frac{1}{3}$  breadth of 3rd antennal segment, if silvery the frontal triangle with some microtomentum; triangle usually shorter . . . . . 16
- 16. Frontal triangle polished black, at most a narrow band of microtomentum on each side slanted anterolaterally from ocellar tubercle to margin of triangle . . . . . 16. *N. ligatura*, n.sp.
- Frontal triangle with well developed microtomentum on apical portion of triangle and along its sides . . . . . 17
- 17. Gena linear to sublinear, hence not conspicuously silvery microtomentose; scutellum yellow; typically frontal triangle with 3 polished black spots, one preocellar, two lateral to posterior ocelli . . . . . 17. *N. tripunctata*, n.sp.
- Gena wider,  $\frac{1}{3}$  breadth of 3rd antennal segment, wide enough to be conspicuously silvery microtomentose; scutellum brown; typically frontal triangle predominantly microtomentose with polished black lateral stripe alongside each posterior ocellus . . . . . 18. *N. laterivittata*, n.sp.

**1. *Notaulacella vittata* Sabrosky, NEW SPECIES**

Diagnosis.—Scutum yellow with reddish to brown stripes, the only vittate yellow species known in Central America.

Male, female. Head mostly yellow, ocellar tubercle and frontal triangle, occiput except narrowly below vertex, narrow lower margin of gena, arista, and narrow dorsal margin of 3rd antennal segment infusate; gena and parafrontal anteriorly silvery microtomentose. Thorax yellow in ground color; scutum with four reddish to brown stripes and on each side a supraalar vittula, none quite reaching scutellum, the lateral stripes broadened anteriorly to a somewhat orbicular spot, the two median stripes narrowly separated by a yellow median acrostical line, the yellow dorsocentral lines wider and slightly impressed; scutellum yellow, post-scutellum polished black; fuscous spots on lower margin of anepisternum and anepi-

meron, and large spot on katepisternum. Abdomen with broad black bands on posterior  $\frac{2}{3}$  of tergites 2-5 (faint on 5), leaving a strongly banded appearance that is especially noticeable in abdomens removed for treatment and dissection of male genitalia. All setae of head and thorax black. Legs chiefly yellow, two narrow fuscous bands on each tibia, and slight infuscation on at least middle femur.

Frons approximately as long as broad at base, and broader at vertex than width of eye viewed from above (21:12); frontal triangle due to subshining, finely microtomentose, relatively short, acute apex only slightly beyond middle of frons, triangle almost equilateral, length barely longer than basal width, base well separated from eyes and triangle thus appearing narrow; gena narrow, slightly less than half breadth of 3rd antennal segment. Legs slender, front femur without spines.

Holotype male and allotype, Tree 8. Paratypes: 7 males, 5 females, Tree 8; 2 males, Tree 6; 2 males, Tree 12.

The holotype is the darkest specimen, with all stripes brown. Most specimens have the median stripes paler, with laterals and vitulae brownish. Palest specimens have all reddish stripes. Undoubtedly this reflects the varying degrees of maturity, and probably brown stripes are typical.

Etymology.—The species is named for the striped scutum.

## 2. *Notaulacella spinosa* Sabrosky,

### NEW SPECIES

Diagnosis.—Yellow thorax, without stripes; frontal triangle smooth and polished, orange-yellow; front femur with two rows of short, strong spines antero- and posteroventrally (unique feature).

Male, female. Head and thorax mostly orange yellow; ocellar tubercle, arista, strong apical band on each tibia, front tarsus (perhaps other tarsi distally), and all bristles black, with a weak bidentate pattern on oc-

ciput and a trace of subbasal band on posterior tibia; gena silvery microtomentose.

Frons approximately quadrate, but measuring slightly broader at vertex than length, and broader than an eye viewed from above (22:14); frontal triangle smooth and polished, large, broad at base (narrowly separated from eyes), and acute apex at anterior margin of frons, the frons subshining outside triangle; gena  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.14 times height of an eye; front femur with six short, strong spines in each row anteroventrally and posteroventrally, the rows forming a groove into which the front tibia fits.

Holotype male, Tree 3; allotype, Tree 6. Paratypes: female, Tree 3; 2 males, 3 females, Tree 6.

Etymology.—The specific name refers to the strong spines on the front femur, the only species known at present to have these.

## 3. *Notaulacella buscki* Sabrosky,

### NEW SPECIES

Diagnosis.—Scutum orange yellow, unstriped. Frontal triangle black, subshining and microtomentose, broad and long.

Male, female. Head partly black above, including occiput and frontal triangle; frons and face yellow; gena, narrow parafacial, and anterior corner of frons silvery microtomentose; antenna yellow, arista and dorsal rim of 3rd antennal segment black. Thorax yellow, scutum orange yellow, unstriped; anepisternum slightly brown dorsally, perhaps a dorsal stripe in maturely colored specimens. Legs chiefly yellow, all tibiae with narrow subbasal and preapical bands.

Frons appearing longer than broad, perhaps because of large frontal triangle, but actually length and basal width approximately equal; frontal triangle large, broad at base, acute apex almost at anterior margin of frons, subshining but densely bright gray microtomentose; posterior fronto-orbital seta stronger than usual, and stronger than postocellar. Gena narrow, slightly over  $\frac{1}{3}$  (0.375) breadth of 3rd antennal segment

and 0.14 times height of an eye. Legs slender, front femur without spines.

Holotype male, Tree 7. Allotype, Tree 8. Paratype male, Tree 14.

Etymology.—The species is named for August Busck, who did extensive collecting in Panama, especially in areas later flooded during the building of the Panama Canal.

#### 4. *Notaulacella compta* (Duda)

*Baseoneura compta* Duda 1930: 71 (Costa Rica).

*Notaulacella compta* (Duda) 1931: 165.

Diagnosis.—Scutum orange yellow, unstriped; frontal triangle black, microtomentose, short, apex at middle of frons.

Male, female. Head partly black, including occiput, frontal triangle, and most of frons; frons anteriorly yellow; broad parafacial silvery microtomentose continuous with that of narrow parafacial and gena; face yellow, bordered narrowly in black, which continues along ventral margin of gena; median plate of clypeus polished black; arista black, and dorsal margin of 3rd antennal segment infuscated. Scutum orange yellow, unstriped; pleuron with some vague brownish areas. Femora yellow; tibiae with narrow subbasal and preapical bands.

Frons approximately as long as broad, but appearing broad, at base 1.83 times width of an eye viewed from above; frontal triangle densely bright gray microtomentose (except for narrow polished area beside each posterior ocellus) like surrounding frons, hence boundaries of triangle obscure, triangle short, acute apex about midway of frons and thus triangle small; gena narrow,  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.10 times height of an eye viewed from above. Front femur without spines.

Distribution.—Costa Rica, Panama. The canopy collecting contained a female from Tree 6; male, 4 females, Tree 7; 3 males, 3 females, Tree 8; male, 3 females, Tree 14; and female, Tree 15. I have also seen 2 females from Panama: Darien Province, Pa-

tino Point, 1 Sept. 1952 (F. S. Blanton), and Canal Zone, Ancon, 8 Oct. 1923 (J. Zetek, No. 2345), "ex pods of *Moringa oleifera* tree" (Moringaceae) [Both USNM].

Several females have the polished areas laterad of the posterior ocelli somewhat larger, hence more conspicuous, but otherwise they are typical *compta*.

#### 5. *Notaulacella* NEW SPECIES no. 19

One male, Tree 7, teneral with thorax collapsed, is clearly a new species. It is one of three yellow and unstriped species with polished black frontal triangle, but its short triangle separates it easily from the other two. The silvery microtomentose gena is also wider than that of any of the other species with yellow thorax, half the breadth of the 3rd antennal segment. Another helpful feature is the black basal tarsomere on the front tarsus, with the remaining four tarsomeres whitish. It shares this feature with *N. albitalarsis*, which has a long frontal triangle and a much narrower gena.

#### 6. *Notaulacella cabimae* Sabrosky, NEW SPECIES

Diagnosis.—Thorax reddish, unstriped, scutellum yellow; frontal triangle smooth and polished, long, apex at anterior margin of frons.

Female. Head partly black, including occiput, frontal triangle, posterior half of frons on each side of triangle, and face and palpi; frons anteriorly orange yellow; in certain lights the frons, parafacial and gena silvery microtomentose; antenna reddish yellow, arista black. Thorax reddish, scutellum yellow. Abdomen black except basally. Legs yellow, tibiae with the usual narrow subbasal and preapical black bands. All setae black.

Frons only slightly longer than broad, apex of frontal triangle at anterior margin of frons, the triangle well separated from eyes at vertex, and sides convex; gena narrow, only  $\frac{1}{10}$  eye height and less than  $\frac{1}{2}$  breadth of 3rd antennal segment. Scutum subshining, thin-

ly pale microtomentose, with numerous rows of hairs, about 8 rows between the dorsocentral lines. Legs slender. Front femur without spines.

Holotype female, Panama: Cabima, May 1911 (A. Busck).

Etymology.—The name is a genitive formed from the name of the type locality, a small village north of the Atlantic entrance of the Panama Canal.

Among the yellowish species, the long and polished black frontal triangle groups this species at once with *N. albitarsis*, which has the distinctive black and white fore tarsus and also pale yellow palpi.

#### 7. *Notaulacella albitarsis*

Sabrosky, NEW SPECIES

Diagnosis.—Scutum yellow, unstriped, with long polished black frontal triangle; front tarsus whitish with basal tarsomere black.

Male, female. Head chiefly yellow, occiput, frontal triangle, and arista black; gena, linear parafacial, and parafrontal silvery microtomentose. Thorax orange yellow. Legs yellow, only distal third of front tibia and the front basitarsus black; middle and posterior tarsi yellow, distal four tarsomeres of front tarsus whitish.

Frontal triangle polished, long, apex at or near anterior margin of frons; ocellar tubercle subshining, microtomentose. Gena narrow,  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.13 times height of an eye viewed from above. Front femur without spines.

Holotype male and allotype, Tree 2.

One male, Tree 5, is in very poor condition but is close to this species, differing only in having the front basitarsus also white but with slight infuscation at its extreme base. Perhaps this is variation or a result of its teneral condition.

Etymology.—The name of the species refers to the chiefly white fore tarsi.

#### 8. *Notaulacella schildi* Duda

*Notaulacella trapezisoptron* var. *schildi* Duda 1933: 200 (Costa Rica).

*Notaulacella schildi* Duda; Sabrosky & Paganelli 1984: 24.

Diagnosis.—Polished black thorax; large and long frontal triangle; gena polished black, not microtomentose (unique character).

Male. Head black, only palpus yellow; 3rd antennal segment brownish except narrowly at base of arista, paler and contrasting with coal black segments 1 and 2; gena polished black; parafacial wider than usual, it and frons alongside frontal triangle bright gray microtomentose. Thorax polished black. Front coxa, and all femora and tibiae except narrowly at knees, black; front basitarsus black, remaining four tarsomeres whitish; middle and posterior tarsi yellow.

Frons with large and long frontal triangle, broad at base, apex at anterior margin of frons, smooth and polished; ocellar tubercle microtomentose; gena narrow,  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.08 times height of an eye. Front femur without spines.

Holotype male: Costa Rica: Higuito San Mateo (Pablo Schild) [USNM].

#### 9. *Notaulacella polita* Sabrosky,

NEW SPECIES

Diagnosis.—Black, with yellow front coxa; frontal triangle polished black; scutum and pleuron almost entirely polished, highly shining.

Female. Head chiefly black, only anterior third of frons, gena in ground color, antenna except arista, and narrow margin of 3rd antennal segment yellow; palpus black; gena and linear parafacial silvery microtomentose; frons outside of triangle bright gray microtomentose. Thorax black. Front coxa yellow; front femur black on distal half, middle and posterior femora shining black

except at knees; front and middle tibiae yellow, posterior tibia broadly black mesally.

Frons not especially broad, width at vertex slightly wider than an eye, viewed from above, and about equal to length of frons; frontal triangle smooth and polished except for microtomentose base and ocellar tubercle, long, its apex at anterior margin of frons; gena narrow,  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.09 times height of an eye.

Thorax and pleuron polished except for slight microtomentum on notopleuron and edge of supraalar area; scutellum microtomentose; scutum densely haired, approximately 10–12 rows between the dorsocentral lines. Front femur without spines.

Holotype female, Tree 8.

The perfect condition of the holotype permits full description from the single example.

#### 10. *Notaulacella paucipilosa* Sabrosky, NEW SPECIES

Diagnosis.—Polished black, near *N. polita* but scutum sparsely haired.

Male. Head black, only gena yellow in ground color and 3rd antennal segment orange basally, contrasted with black first two segments; gena and narrow parafrontal and parafacial silvery microtomentose. Thorax entirely black. Front coxa at least partly black (probably black in fully mature specimens); all femora black except at knees; all tibiae two banded, all tarsi yellowish, somewhat infuscated distally.

Frontal triangle smooth and polished, broad and large, occupying most of frons, apex at anterior margin of frons; ocellar tubercle polished black (unique); gena narrow,  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.14 times height of an eye.

Scutum and pleuron polished except for microtomentum in a narrow prescutellar band and on notopleuron; scutellum microtomentose; scutum sparsely haired, 6–8 rows between dorsocentral lines. Front femur

without spines. Vein 2 + 3 shorter than usual in genus, though not as short as in *N. sagittata*, length of 2nd: 3rd costal sectors as 30: 19.

Holotype male, Costa Rica: La Suiza, April 1922 (Pablo Schild).

Etymology.—The name, an adjective, refers to the sparsely haired scutum.

#### 11. *Notaulacella octicola*, NEW SPECIES

Diagnosis.—Thorax chiefly black, but humeri whitish yellow and dorsocentral lines paler, appearing to mark off stripes. Front coxa yellow and legs chiefly yellow.

Male, female. Head chiefly yellow, the occiput, frontal triangle, a band across vertex between eyes, narrow line on each side (facial ridge) continued along ventral margin of gena, narrow median plate of clypeus, arista, and narrow dorsal margin of 3rd antennal segment black; gena silvery microtomentose continuous with microtomentum of linear parafacial and broad parafrontal clear to vertical setae; palpus yellow. Thorax chiefly black, the humerus, notopleuron, and scutellum bright whitish yellow; dorsocentral lines narrowly yellow, appearing to delineate three broad stripes. Abdomen black, tergites 3–5 almost entirely so, only narrowly yellow at base, as revealed in specimens treated and dissected for male genitalia. Front coxa yellow; front femur yellow, middle and posterior femora more or less browned mesally; all tibiae with two narrow bands, subbasal and preapical; tarsi yellow.

Frons approximately quadrate, width at vertex 1.4 times width of an eye, viewed from above; frons and frontal triangle microtomentose, latter small, very short, ending little anterior to median ocellus; gena narrow,  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.09 times height of an eye.

Scutum and upper part of pleuron dull or only weakly shining, rather thickly brown-



gray microtomentose. Front femur without spines.

Holotype male, allotype, and 26 paratypes (11 males, 15 females), Tree 8. Other paratypes: female, Tree 1; female, Tree 6; 2 females, Tree 7.

Etymology.—The specific name is derived from the long series collected on Tree 8.

**12. *Notaulacella zeteki* Sabrosky,  
NEW SPECIES**

Diagnosis.—Thorax entirely black; front coxa and most of legs black; gena and broad parafrontal silvery microtomentose.

Male, female. Head black except for gena yellow in ground color and orange basal third of 3rd antennal segment; basal antennal segments coal black, in striking contrast to the partly orange 3rd segment; gena, linear parafacial, and broad parafrontal silvery microtomentose; palpus black. Thorax entirely black. Front coxa black; all femora and tibiae black except narrowly at knees; tarsi chiefly yellowish.

Frons appearing longer than broad, and measuring slightly longer, but head slightly teneral and the proportions are undependable; ocellar tubercle large and microtomentose; frontal triangle smooth and polished, long, with apex at anterior margin of frons, length nearly 1.7 times breadth at base; gena relatively broad for the genus, nearly half breadth of 3rd antennal segment and 0.14 times height of an eye. Scutum subshining, thinly microtomentose. Front femur without spines.

Holotype female, allotype male, Panama: Canal Zone, Barro Colorado Island, Nov. 1941 (J. Zetek, No. 4920), "bred *Calathea violacea*" (Marantaceae, tropical herbs). Paratypes: 2 males, one female, same data as holotype; female, Tree 7.

Also two females, poor condition and not included in the type series: one, same data as holotype, the other from the same island, June 1942 (J. Zetek, No. 4981), "*Fomes* sp." (shelf fungus, Polyporaceae) [USNM].

Etymology.—The specific name, in the genitive, honors the memory of the collector, James Zetek, who spent many years of dedicated service in entomological work in Panama, and who recorded the only clues to the biology of *Notaulacella* (See *N. zeteki* and *N. compta*).

**13. *Notaulacella lineigena*  
Sabrosky, NEW SPECIES**

Diagnosis.—Thorax entirely black, front coxa and legs chiefly black; gena almost linear.

Male, female. Head black except narrow gena, which is yellow in ground color beneath silvery microtomentum; 3rd antennal segment chiefly infuscated but reddish brown ventrally at base; palpus black.

Frons subquadrate; ocellar tubercle microtomentose; frontal triangle polished, but anteriorly finely roughened, not smooth, long, apex at or near anterior margin of frons; parafrontal broad, gray microtomentose in certain lights, possibly brighter in better specimens; gena very narrow, almost linear,  $\frac{1}{3}$  breadth of 3rd antennal segment and 0.09 times height of an eye. Front femur without spines.

Holotype female, Tree 13; allotype, Tree 8.

Etymology.—The specific name is a noun, referring to the linear cheek.

The species is close to *N. zeteki* but the broader gena and its brilliantly silvery microtomentum of *zeteki* makes it easy to separate the otherwise very similar species. The male is somewhat teneral.

**14. *Notaulacella sagittata*  
Sabrosky, NEW SPECIES**

Diagnosis.—Black species with yellow front coxa and large, sagittate, dull, densely microtomentose frontal triangle.

Male. Head chiefly black, including occiput, frontal triangle, frons except anterior fourth, linear facial ridge and ventral edge of gena, arista, and outer margin of 3rd antennal segment; cheek microtomentose,

parafrontal gray microtomentose; palpus yellow. Thorax entirely black. Front coxa yellow, all femora more or less browned, all tibiae with the usual two narrow bands, subbasal and preapical.

Frons appearing longer than broad; frontal triangle densely microtomentose, large, apex at  $\frac{2}{3}$ – $\frac{3}{4}$  way to anterior margin of frons, measuring as long as broad at base but appearing longer, the sides somewhat convex causing triangle to appear arrowhead-shaped; gena narrow, almost linear,  $\frac{1}{4}$  breadth of 3rd antennal segment and 0.11 times height of an eye. Scutum and scutellum densely brown-gray microtomentose. Front femur without spines.

Holotype and one paratype, males. Tree 6.

Etymology.—An adjective, derived from the Latin *sagitta*, an arrow.

In the holotype, vein R2 + 3 is shorter than usual, ending in costa barely more than midway between apices of R1 and R4 + 5, the length of 2nd and 3rd costal sections as 28:25. Venation in the paratype as usual for the genus, with long 2nd section.

**15. *Notaulacella broadheadae*  
Sabrosky, NEW SPECIES**

Diagnosis.—Black species, with moderately long, polished black frontal triangle and narrow silverly microtomentose gena.

Male, female. Head black on occiput, frontal triangle, posterior corners of frons, and median plate of clypeus, the frons chiefly, and antenna except infuscate outer margin of 3rd segment, orange yellow; face brownish; gena brilliant silverly microtomentose, and the parafrontal and posterior part of frons likewise, viewed at certain angles; palpus yellow. Setae and arista black. Thorax entirely black. Legs with all femora black except narrowly yellow at knees; all tibiae yellow with two narrow black bands, one subbasal, one preapical; tarsi chiefly yellow.

Frons slightly longer than broad (28:25); frontal triangle polished, relatively long, base of triangle not touching eyes, acute apex

nearly reaching anterior margin of frons, sides of triangle straight with narrow ridge along each side; ocellar tubercle dull gray microtomentose; gena narrow but not linear,  $\frac{1}{2}$  breadth of 3rd antennal segment and  $\frac{1}{5}$  (5:35) the height of an eye.

Mesoscutum and scutellum subshining, thickly gray microtomentose; pleuron almost entirely polished. Wing with R1 unusually long, as is cell r1 (marginal cell), the 3rd costal section only slightly longer than 4th section. Front femur without spines.

Holotype male and allotype, Tree 7. Other paratypes, Panama: 2 females, same as holotype; male, Canal Zone, Barro Colorado I., July 1967 (W. W. Wirth, light trap); male, Chiriqui, Chiriqui Viejo River, El Volcan 5280 ft., 22 July 1966 (A. Broce, light trap) [All USNM].

Etymology.—The specific name, in the genitive case, honors the collector of this interesting material from the forest canopy.

**16. *Notaulacella ligatura* Sabrosky,  
NEW SPECIES**

Diagnosis.—Black species with almost linear, silvery microtomentose gena; frontal triangle polished but typically with a narrow band of brownish microtomentum on each side from ocellar tubercle to side of triangle.

Male, female. Head black, with anterior half of frons and antenna except narrow anterior margin of 3rd segment orange yellow; face brownish to yellow; gena silverly microtomentose. Thorax chiefly black, scutum partly brownish on sides but probably darker in more mature specimens. Front coxa bright yellow; all femora predominantly yellow, middle and posterior femora with moderately broad median band; all tibiae yellow, each with two bands, a subbasal and a preapical; tarsi yellowish.

Frons approximately as long as broad; frontal triangle relatively narrow, well separated from eyes at base, acute apex at about  $\frac{3}{4}$  way to anterior margin of frons, with sides straight, chiefly smooth and polished, with narrow band of microtomentum on each

side slanted anterolaterally from the microtomentose ocellar tubercle to side of triangle; gena very narrow, sublinear,  $\frac{1}{6}$  breadth of 3rd antennal segment and 0.05 times eye height.

Mesoscutum, scutellum, and upper portion of anepisternum subshining, thinly microtomentose, remainder of thorax polished. Front femur without spines.

Holotype female, Tree 12. Allotype, Tree 8. Paratypes, male, 2 females, Tree 8; female, Tree 6; male, female, Tree 7. Also paratype female, Costa Rica: Higuito San Mateo (Pablo Schild) [USNM, published Duda 1933: 199 as *N. fiebrigi* (Duda)].

Etymology.—A noun in apposition, directly from the Late Latin *ligatura*, meaning a band or ligature.

**17. *Notaulacella tripunctata***  
Sabrosky, NEW SPECIES

Diagnosis.—Black, thinly microtomentose thorax and linear gena; frontal triangle large, partly thinly microtomentose, with three large polished areas on triangle.

Male, female. Head with black occiput, frontal triangle, and posterior half to  $\frac{3}{5}$  of frons, the frons anteriorly and antenna except infuscate outer margin of 3rd segment orange yellow; face brownish yellow; gena silvery microtomentose but inconspicuous because sublinear. Thorax black except for yellow or yellowish scutellum. Legs almost entirely yellow.

Frons slightly longer than broad; frontal triangle large, more than  $\frac{3}{4}$  length of frons, partly brownish microtomentose with three polished areas, one closely anterior to median ocellus and one along each side of the microtomentose ocellar tubercle, the total appearance a rather shining black triangle; gena sublinear, less than  $\frac{1}{4}$  breadth of the small 3rd antennal segment and less than  $\frac{1}{12}$  the eye height.

Dorsum of thorax and upper anepisternum chiefly microtomentose, subshining. Front femur without spines.

Holotype male, Tree 15; allotype, Tree 7. Paratypes: female, Tree 7; female, Tree 3;

male, female, Tree 8; female, Canal Zone: Gamboa, Pipeline Road, July 1967 (W. W. Wirth, Malaise trap) [USNM].

Etymology.—An adjective, referring to the three polished spots on the frontal triangle.

**18. *Notaulacella laterivittata***  
Sabrosky, NEW SPECIES

Black species with narrow (but not linear) silvery microtomentose gena and chiefly microtomentose and subshining frontal triangle.

Male, female. Head black, including all setae, the frons anteriorly and antenna chiefly orange yellow; face brownish; gena and parafacial, and in certain lights the parafacial, silvery microtomentose. Thorax entirely black. Front coxa bright yellow, slightly brownish at base; all femora black or brown except narrowly at knees; all tibiae yellow with two narrow black bands, one subbasal, one preapical; tarsi yellowish.

Frontal triangle broad, length and breadth about equal, and moderately long, acute, apex beyond midway of frons, dull gray microtomentose except for narrow polished stripe on each side of, and slightly longer than, ocellar tubercle; gena narrow but not linear,  $\frac{1}{3}$  breadth of 3rd antennal segment and  $\frac{1}{8}$  the eye height.

Mesoscutum, scutellum, and upper part of anepisternum brownish gray microtomentose; pleuron chiefly polished. Front femur without spines.

Holotype female, Tree 2; allotype, Tree 3. Paratype: male, Tree 8. A female from Tree 8 is a variant but may belong to this species. Another female, Tree 4, is teneral and crumpled and is not included in the type series.

Etymology.—The specific name, an adjective, refers to the lateral polished stripes on the frontal triangle, meaning literally 'side-striped.'

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